The MNE versus the local firm: MNE relative location flexibility as a foreign firm advantage

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Abstract

Purpose – This paper aims to investigate whether multinational enterprises (MNEs) have a heightened propensity to seek density in their location choices and to engage in locations with inherent value-creating potential compared to local firms.

Design/methodology/approach – Drawing on economic geography and using a unique, geographically detailed firm-level data set covering all firms in Sweden, the authors analyze subnational patterns in the location choices of foreign-owned firms compared to those of domestic firms. This study also makes a methodological contribution by exploring detailed subnational patterns down to the level of each plant or office unit's address, within a firm.

Findings – This study finds that MNEs tend to choose locations that are more densely populated and to co-locate with other foreign firms in the market. Contrary to theoretical expectations that local firms should have an advantage due to their local awareness, the findings suggest that foreign multinationals can be more effective at leveraging the economic benefits of location. To explain this finding, the authors discuss the concept of MNEs' relative location flexibility, suggesting that MNEs are well-equipped to strategically target areas that can generate value and contribute to the formation of clusters.

Research limitations/implications – This research contributes to theories on internationalization, location choice and the formative and nascent dynamics of clusters. The findings nuance assumptions in international business theory regarding the advantages of being embedded in local business systems and the disadvantages of being foreign. The authors also discuss the implications of MNE co-location for location choice and market entry theory.

Originality/value – Originality pertains to the comparative analysis of multinational enterprises and local firms in a subnational context. The concept of MNE relative location flexibility is a novel way of explaining how MNEs can target areas that generate value and contribute to the formation of clusters.

Keywords Co-location, MNE, Cluster, Location choice

Paper type Research paper

1. Introduction

The proliferation of multinational enterprises (MNEs) spanning the globe, alongside the increasing importance of local industrial clusters, are two prominent features of economic development in recent decades (McCann, 2008; Iammarino and McCann, 2010). These features are tightly intertwined. The international development and value creation of MNEs in global markets are influenced by clusters (Yang, *et al.*, 2013). Likewise, clusters are

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shaped by the presence of multinational firms, which bring global competencies and resources while connecting cities and clusters to international networks (Bathelt *et al.*, 2004; Neal, 2008). Examining location choice in the context of clusters is therefore particularly interesting. The literature in international business (IB) has historically analyzed location choices at the country level (Dunning, 2009; Beugelsdijk *et al.*, 2010). However, researchers have made progress in bridging the field with Urban Economics and Economic Geography, calling for studies of MNE location patterns at the subnational level that account for intra-national regional differences (Beugelsdijk and Mudambi, 2013). This study responds to that call by continuing to bridge these research traditions and comparing locational patterns of MNEs and domestic firms at the subnational level.

The location strategy of a multinational firm is the result of a complex interplay of interlinked actors and forces (for an overview, see Dunning and Lundan, 2008, and Kim and Aguilera, 2016). Firms seek the economic benefits by locating close to buyers and suppliers, accessing factors of production, and reducing tariff burdens (Alfaro and Chen, 2014), as well as by absorbing and accumulating knowledge emanating from local clusters (Cantwell, 1995; Sölvell and Zander, 1995; Malmberg *et al.*, 1996; Frost *et al.*, 2002). This has been referred to as a strategic asset-seeking direct investment behavior (Dunning and Lundan, 2008). Foreign-owned firms are particularly interesting in this regard, as they represent the more dynamic segment of the firm spectrum (Yeaple, 2009) and are generally more footloose than domestic counterparts. This can give them a strategic advantage over domestic firms (Görg and Strobl, 2003). At the same time, IB literature suggests that local activities generate superior local knowledge and create "insidership" in key business networks (Johanson and Vahlne, 2009), whereas foreign firms experience outsidership and the liability of foreignness (Zaheer, 1995). These arguments highlight how local firms can instead have advantages over foreign entrants.

This paper aims to investigate this puzzle by analyzing whether foreign firms make different locational choices regarding various agglomeration externalities than domestic firms. More specifically, we examine whether MNEs have a heightened propensity to seek density in their location choices, thereby reflecting the ability to engage in locations with inherent value-creating potential. We achieve this by investigating the effects of urbanization (the shift of populations and activities from rural to urban settings, which affects commercial activity), clusters (the geographic concentration of interconnected companies and institutions), and co-location effects (the strategic decision of multiple companies to establish operations in the same area). We find that these mechanisms are interconnected ways through which MNEs gain locational advantages while contributing to the development of local economies.

We find that fine-grained micro-geographic data are particularly useful for studying the context of foreign firms' subnational locational choices and for constructing precise agglomeration measures (Ascani, 2018). The data set used in this study covers all plants in Sweden in 2015, regardless of industry or size, with detailed location information and key economic indicators. By exploring subnational patterns in great detail down to the level of the address of each plant or office unit, thereby accounting for inherently spatial agglomeration effects, this study also makes a methodological contribution. This contrasts with traditional research on MNE location, which often uses the nation-state (Mudambi and Swift, 2012) or cities (Blevins *et al.*, 2016) as the unit of analysis, or conventional foreign direct investment (FDI) location studies (e.g. Guimarães and Figueiredo, 2000; Crozet *et al.*, 2004), which focus on the explicit location decisions made when a foreign firm enters a market.

Our results show that foreign-owned firms are consistently more likely than domestic firms to locate in denser areas. As a contribution, we refer to MNEs' differentiation between locations and their selection of areas offering positive agglomeration externalities as "relative location flexibility". The term is inspired by, but distinct from, Buckley and Casson's (1998) concept of the flexible MNE, which alludes to internal resource allocation and product flexibility in global value chains under uncertainty (Buckley, 2009). Our concept instead emphasizes the comparative advantages of MNEs *vis-à-vis* local firms in subnational locational choices, highlighting MNEs' ability to engage in localized activities in dense locations with inherent value-creating potential.

Our findings nuance assumptions in IB theory regarding the advantages of being embedded in local business systems and the disadvantages of being foreign (Zaheer, 1995; Jack and Anderson, 2002; Johanson and Vahlne, 2009; Sorenson, 2018) by illustrating a pattern that reflects an opposite scenario. We also advance discussions on MNE location choices (Dunning, 1988; Cantwell, 2009), including the implications of location and co-location within business systems composed of spatially proximate actors (Narula and Santangelo, 2012; Puig *et al.*, 2020). To that end, we enrich the understanding of the formative dynamics of clusters. Our findings also indicate that MNE establishments in clusters create positive spirals of localization, influencing the international commitment and market entry choice of other MNEs (Johanson and Vahlne, 2009) while contributing to the growth of both nascent and mature clusters, an area that has not been extensively explored in prior research (Chen *et al.*, 2021).

2. Theory and hypotheses

Agglomeration externalities have long been a central focus across multiple scientific disciplines. In the case of "localization" economies (Marshall, 1920), the main drivers include access to pools of specialized and qualified labor, opportunities for knowledge spillovers, lower transportation costs and shared access to common machinery. These benefits typically remain within the boundaries of a single industry, although the precise definition of that industry is open to debate.

In contrast, many scholars argue that the sheer scale of economic activity concentrated in cities generates benefits in its own right. These benefits may take the form of improved access to buyers and suppliers (Harris, 1954), shared use of advanced infrastructure (Fujita *et al.*, 1999), or cross-fertilization between industries driven by the diversity of economic activity (Jacobs, 1969). Distinguishing between the effects of cities and general agglomerations has been the subject of a longstanding debate, and there is little conclusive empirical evidence supporting any single argument (Beaudry and Schiffauerova, 2009). Whereas debates in Economic Geography have predominantly focused on the attractiveness of locations, the IB literature has emphasized the role of firms (McCann and Mudambi, 2005). As conceptualized in the Ownership, Location, Internalization (OLI) framework (Dunning, 1988), location decisions are inherently complex. The "L" component captures only the direct advantages of a particular location, while the final choice emerges from the interplay of all three OLI factors (Mudambi and Mudambi, 2002). However, IB location-related empirical research has largely focused on country-level analysis, offering limited insights into subnational location patterns (Beugelsdijk *et al.*, 2010).

By combining perspectives from IB and Economic Geography, scholars have increasingly emphasized the processes of local innovation and knowledge creation. From this standpoint, one of the most compelling reasons for a multinational firm to establish a presence in a particular location is to tap into agglomeration advantages (Cantwell, 1989; Porter and Sölvell, 1998; Frost *et al.*, 2002; Bathelt *et al.*, 2004; Iammarino and McCann,

2010; Zhu *et al.*, 2012; Blanc-Brude *et al.*, 2014). At the same time, operating within a dynamic local environment enables firms to strengthen the competencies of their subsidiaries by engaging with and learning from that environment (Holm *et al.*, 2003).

The location patterns of foreign-owned firms may appear similar to those of firms in general; however, several indications suggest important differences. Multinationals can be better positioned to capture location-specific advantages than domestic firms, enabling them to leverage these benefits more effectively, as well as to manage uncertainty and risk by distributing resources across global value chains (Buckley and Casson, 1998). Foreign-owned firms are typically less constrained by historical ties and have greater freedom in choosing locations, providing them with the advantages of being foreign (Edman, 2016). Unlike domestic firms, they may not face limitations from established networks, the residence of owners or founders, or other social connections to local communities. In contrast, owners and entrepreneurs of local firms often possess deep social and cultural ties to their communities, making them embedded (Jack and Anderson, 2002; Dahl and Sorenson, 2012; Sorenson, 2018). The relative flexibility of multinational companies has been examined by Görg and Strobl (2003) and van Beveren (2007), who found that foreign-owned firms are generally less constrained in host countries than domestic companies. Although these studies primarily focused on the likelihood of firm exit and employment fluctuations, we expect foreign-owned firms to also exhibit greater flexibility upon entry, allowing them to more fully exploit agglomeration advantages and select more favorable locations than domestic firms.

Foreign-owned firms may also select locations with higher agglomeration externalities, as these can enhance productivity (Caves, 1974). Bernard and Bradford Jensen (1999) show that firms engaged in exports tend to be significantly more productive than their domestically oriented counterparts. Building on this, Helpman *et al.* (2004) and Tomiura (2007) argue that firms engaging in FDI are even more productive than exporters, suggesting that foreign-owned firms represent the most productive segment of their home countries' economies and may therefore be better positioned to capitalize on agglomeration externalities than local companies.

MNEs could seek agglomeration and contribute to it in various ways. We hypothesize that three key areas can provide locational advantages while contributing to the development of local economies, namely the effects of urbanization, clusters and co-location. For example, while urban areas may attract MNEs due to general agglomeration effects, it is valuable to compare these broader effects with the more specific incentives offered by clusters and co-location benefits.

The basic effects of agglomeration stem from the economies generated through urbanization, which create general proximity benefits that are not tied to any specific industry. Following Jacobs (1969), these benefits arise from the concentration of population in urban areas, which stimulates demand for a wide range of goods and services. Urban centers also offer superior access to essential infrastructure, including transportation and communication networks, which enhances operational efficiency. They often act as hubs within broader networks, linking to other cities and catchment areas (Lorenzen *et al.*, 2020), sometimes resulting in between-industry knowledge spillovers (Ahamed *et al.*, 2023). In addition, the diverse labor pool found in cities provides firms with access to a broad spectrum of skills and expertise, which supports economic growth and strengthens competitiveness. Given these advantages, we expect foreign firms to design their market entry strategies to optimize these advantages (for example, to create a fit between the organization and the local labor supply). Based on this reasoning, we hypothesize:

H1. Compared to domestic firms, foreign-owned firms are more likely to locate in denser areas to exploit urbanization economies.

By establishing themselves within a business cluster, foreign firms can gain significant proximity advantages. They can access industry-specific networks of suppliers, service providers and skilled labor; enhance operational efficiency; and reduce costs. The dense concentration of firms and knowledge within clusters further expands the available knowledge base, offering foreign firms opportunities to experiment with new resource combinations that may spur business development (Speldekamp *et al.*, 2020). Thus, the inherent resource-based opportunities generated by clusters can provide suitable entry points into the market, helping firms mitigate the liability associated with outsidership in industrial relations (Johanson and Vahlne, 2009). In this context, foreign firms may be better positioned than domestic counterparts to capitalize on clusters, as they are often free from entrenched relationships or resource dependencies that can constrain the flexibility of local firms. This freedom enables foreign firms to explore new opportunities for collaboration and growth within the cluster, leading us to formulate the following hypothesis:

H2. Compared to domestic firms, foreign-owned firms are more likely to locate in local clusters to internalize localization benefits.

Another, more specific, agglomeration factor that could strongly influence the location choices of foreign subsidiaries is the higher level of uncertainty that MNEs face compared to domestic firms (Zaheer, 1995). As a result, they are more likely to imitate the location decisions of previous entrants (Knickerbocker, 1973; Barba Navaretti and Venables, 2004; Mariotti *et al.*, 2010). While MNEs may have weaker local networks than incumbents (Zaheer *et al.*, 2009), co-location can help compensate for this disadvantage by facilitating the development of local networks. Notably, the firm-location imitation rationale has typically referred to the process of choosing one country over another (e.g. Barry *et al.*, 2003). Similarly, co-locating firms can gain legitimacy through the firms they follow, thereby reducing the liability of foreignness (Zaheer, 1995) and outsidership in foreign markets (Johanson and Vahlne, 2009). By staying close to firms that already enjoy credibility in the market, newly entering MNEs can receive support in establishing their own credibility with local stakeholders within the agglomeration.

While MNEs who co-locate into clusters could take advantage of some of the benefits agglomeration economies, they also themselves add to this pool, such as knowledge spillovers, which occur when firms unintentionally or intentionally share important knowledge that improve the likelihood of value creation (Narula and Santangelo, 2012; Tallman and Phene, 2007), as well as the development and sharing of infrastructure, or improved access to skilled labor and business networks (Alcácer and Chung, 2007).

However, many of the reasons for this behavior may also apply when analyzing subnational patterns. For instance, DeCoster and Strange (1993) developed a model in which the signals sent by the location choices of property developers to their competitors can lead to (potentially excessive) agglomeration due to imitation behavior in the industry. Similar processes may influence the subnational location choices of foreign-owned firms, as they select areas that already host other multinationals. Earlier studies have documented a tendency for MNEs to mimic FDI behavior of firms from the same home country at the subnational level (Ulgado and Lee, 2004; Chang and Park, 2005; Puig *et al.*, 2020; Villaverde and Maza, 2012; Zhu *et al.*, 2012; Hu *et al.*, 2021). For example, Li *et al.* (2023) show that MNEs co-located with firms from the same country in response to uncertainty following a diplomatic dispute. We argue that the co-

location mechanism may also apply across MNEs from different countries as a way to manage general uncertainty while simultaneously facilitating access to shared resources. Thus, we hypothesize:

H3. Foreign firms are likely to co-locate at a sub-national level with other foreign firms in a host country

3. Method

The focus of this study is on MNEs' location choices and the quality of these locations. While the main analysis allows us to select the most relevant subset of firms (e.g. only firms with employees or only those in traded industries exposed to international trade), the computation of the surrounding environment relies on exhaustive data. To achieve this, we combine a high-quality data set covering all corporations in Sweden as the primary source with less detailed data sources that offer broader coverage.

This study is somewhat different from traditional FDI location studies (e.g. Guimarães and Figueiredo, 2000; Crozet *et al.*, 2004) due to the nature of the data used. Specifically, the analysis relies on exploring the locations of all firms in the economy and analyzing the differences in patterns of both foreign-owned and domestic entities and not explicit location decisions.

We use a fine-grained division of Sweden and its neighboring countries into regions and use plant-level data to compute the approximate density of each industry in each region. We also rely on detailed transportation infrastructure data and commuting flows between regions to estimate the strength of interaction across space. An overview is provided in Figure 1.

This research design is operationalized via a series of logistic regressions where the outcome variable is whether a firm is foreign. This means that the results can be interpreted

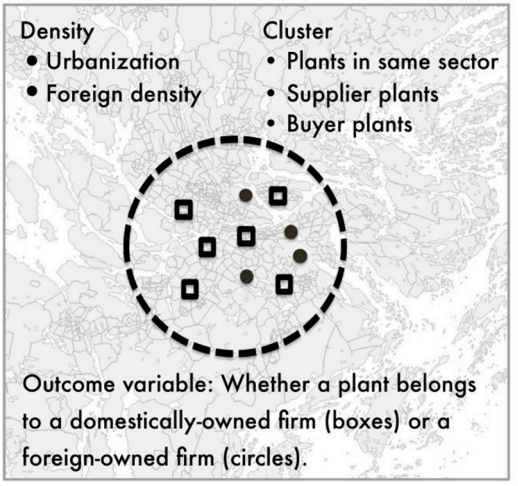

Figure 1. Density/Cluster

Note(s): Map indicates the distribution of plants, distinguishing between domestically owned (boxes) and foreign-owned firms (circles), with details on density and clustering patterns

Source: Authors' own work

as a comparison between foreign and domestic firms. For example, if we pick a random firm in the data set and look at its characteristics as well as the characteristics of the region it is in, the coefficients correspond to increased or decreased odds that a given firm is foreign. Thus, the intercept-only model would simply measure the share of foreign firms in the data set. Every additional coefficient shows how more or less likely a firm is to be foreign for every increase in this additional variable.

All the models include 56 industry dummies to capture the varying propensities of industries to attract foreign investment. We also wanted to capture the broad geographic trends, such as climate and distance from the coast. We proxy all such factors by including regional coordinates (easting and northing of centroids in the EPSG 3021 coordinate system) and adding them, as well as their interaction, to the model.

3.1 Firm and plant data sources

The firm-level data set we use to test the hypotheses is the Serrano database provided to us by Bisnode AB. This database covers all corporations in Sweden, which represent close to 60% of national employment. It also contains information on each corporation's ownership structure, from which we coded all firms with 50% or more ownership by entities outside Sweden as "foreign."

While the firm-level data is more detailed and has more indicators, it has very low spatial resolution and often only contains the official legal address of the firm. Exploring the firm's spatial environment requires analysis of individual plants with as precise a location as possible (the term "plant" is used in the broad sense of an office, factory, laboratory, retail store or any place where business is conducted, goods are made, stored, or processed or services are rendered). To achieve this, we complement firm-level data with a snapshot of the Par plant-level database retrieved in January 2015, also provided to us by Bisnode AB. It represents establishment-level data for all Swedish companies and organizations, based on official company registration sources and in-person verifications of establishment locations.

This data set contains information on close to 1.25 million plants in Sweden, including the data on parent company, five-digit industry code, visiting address and size class of employment. We also employed a combination of data sources from local municipalities, Bing Maps and OpenStreetMap to convert visiting addresses to geographical coordinates of firm locations. Finally, we converted the precise address information into the regional division we use in the study, which we detail below. Note that the data has no restrictions on the minimum number of employees, covers all industries and legal entities, and provides a comprehensive picture of the distribution of economic activity in Sweden. The exhaustive nature of the plant-level data is useful not only for precise placement of the firms under analysis. It is also important for computing the environmental indicators, such as precise employment figures in each location/industry.

3.2 Local density indicators

The three proposed hypotheses require the estimation of several local indicators, including urbanization, cluster density (which encompasses sector, supplier and customer access), and foreign firm density. All indicators share the same basic structure and measure the estimated strength of interaction among employees in different firms and organizations. We focus on employees rather than products to better capture knowledge flows. Specifically, we measure the ease with which an employee in one firm can interact with employees in other firms. In all cases, the weighting is based on estimates of interaction strength between regions, derived from commuting flows and transportation infrastructure.

All indicators are computed by weighting the number of employees in each region/industry in combination with the estimated strength of interaction between the regions. What differs across the indicators is which employees we consider in the weighting:

$$\text{Indicator}_{ir} = \sum_{f} \text{Employees}_{fr} * \text{RegionalInteraction}_{rs(f)} * \text{IndustryInteraction}_{ij(f)}$$

where f indexes firms, i indexes industries, r indexes regions, and $s(f)$ and $j(f)$ denote the region and industry of firm f, respectively.

Urbanization measures the overall density of employment around each firm; we thus consider every employee in another region with the same weight. For foreign firm density, we only consider employees in plants owned by foreign firms. Cluster density only considers employees in the same 2-digit industry, and supplier and customer access indicators use the weights from the 2016 input-output tables for Sweden. For example, if industry B's share in all purchases by firms of industry A is 30%, each employee in industry B would have a weight of 0.3 in computing the supplier access. Similarly, if a firm in industry A sells 15% of all its goods to firms in industry C, the share of employees in C will be 0.15 when computing customer access for firm A. The indicators are summarized in Table 1.

It should be noted that these measures are correlated, since they are all related to both the overall density and the density of the firm's industry itself. However, in our tests, we have found that the measures carry supplementary information, and we can thus use them all in our analysis. The results were robust to different industry compositions or even to using the plant-to-plant distances instead of regionalizing them. It should be noted that the cross-sectional nature of the data may limit our ability to account for employee mobility, which may partially inflate the observed cluster density effects of foreign firms. An illustration of the correlations between key variables is provided in Figure 2, below.

3.3 Regional economic environment indicators

Our core analysis focuses on Swedish corporations, but computing the quality of their environment requires data on all economic activity and the linkages across locations. To operationalize, we relied on country-level data from the World Input-Output Database (WIOD) (Timmer *et al.*, 2015) and regional indicators in Nordic countries. In Sweden, we used 9,209 SAMS areas to approximate the continuous geography. The areas were defined to promote homogeneity, ensuring that each has approximately 1,000 inhabitants. We thus achieve detail in densely populated areas while keeping the computational burden manageable. To account for strong interactions with neighboring countries, we additionally used municipality-level data in Denmark, Finland and Norway (99, 311 and 428, respectively). We thus used a total of 10,047 regions. See Figure 3 as an example of the spatial scale of the regions, as well as the difference between a local measure like density and the accessibility measure that varies much more smoothly in space.

Computing the regional environment variables relied on having several core indicators available for each region-industry combination, as well as a measure of interaction across regions. In each region, we required per-industry data on the total demand and supply for each product in monetary terms, across all industries. To convert these aggregates into firm-level indicators, we also make a standard assumption that aggregate input-output data is representative of a typical firm's input mix. Since WIOD is a high-quality source that has been extensively tested and used, we used it as an aggregate baseline for all countries. We complement this with regional industry employment numbers to break down the WIOD totals by region. We used a combination of plant-level data (business sector in Sweden,

Table 1. Summary of indicators

Indicator	Hypotheses	Description	Formula
Urbanization	1, 2, 3	Weighted accessibility to all employees	$\sum_f \text{Employees}_{fr} * \text{RegionalInteraction}_{rs(f)}$
Foreign density	3	Weighted accessibility to employees in foreign-owned firms	$\sum_f \text{ForeignEmployees}_{fr} * \text{RegionalInteraction}_{rs(f)}$
Cluster density	2	Weighted accessibility to employees in the same 2-digit industry	$\sum_f \text{SameClusterEmployees}_{fr} * \text{RegionalInteraction}_{rs(f)}$
Supplier access	2	Weighted accessibility to employees in 2-digit industries weighted by the share of that industry in the *purchases* of the industry of the focal firm	$\sum_f \text{Employees}_{fr} * \text{RegionalInteraction}_{rs(f)} * \text{WIODInputShare}_{ij(f)}$
Customer access	2	Weighted accessibility to employees in 2-digit industries weighted by the share of that industry in the *sales* of the industry of the focal firm	$\sum_f \text{Employees}_{fr} * \text{RegionalInteraction}_{rs(f)} * \text{WIODOutputShare}_{ij(f)}$

Note(s): Where *f* indexes firms, *i* indexes industries, *r* indexes regions, and *s*(*f*) and *j*(*f*) denote the region and industry of firm *f*, respectively. The weights in Regional Interaction are computed using the travel times between the regions of the focal firm and the other firm. All measures are rescaled to have a median of 1 before we take logarithms
Source(s): Authors' own work

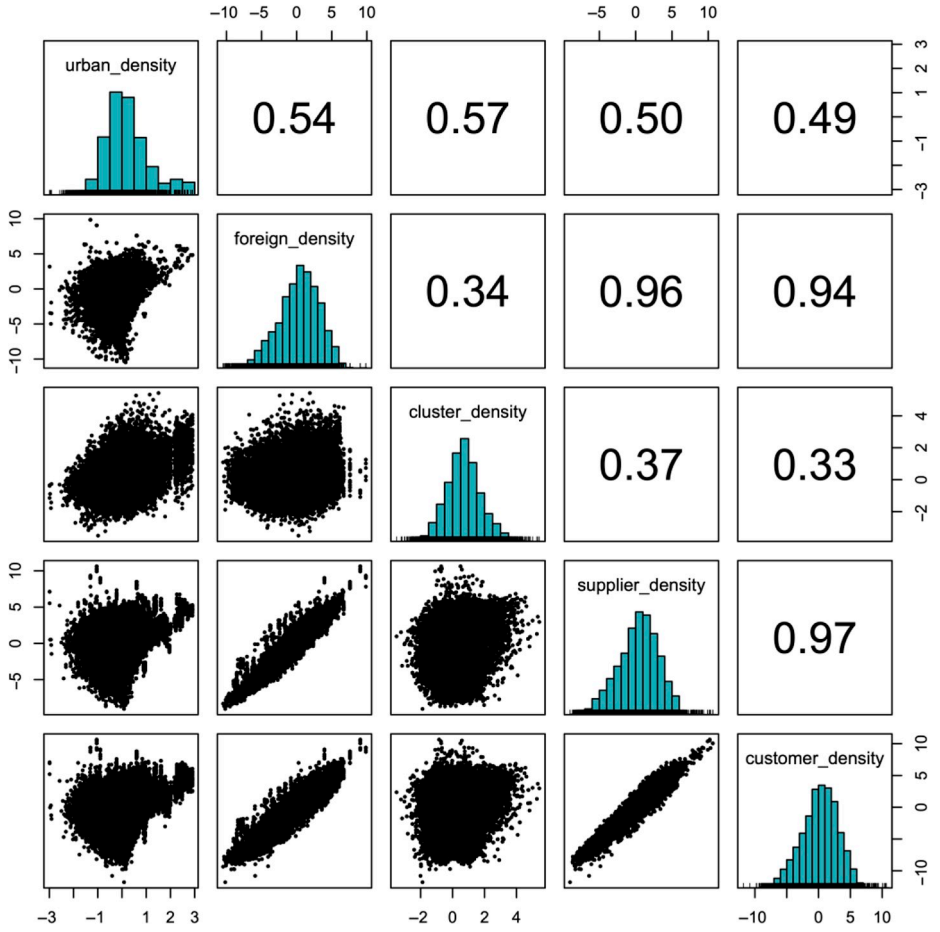

Figure 2. Variable matrix

Note(s): A matrix of scatterplots, histograms, and numerical correlations showing pairwise relationships among five variables labelled urban density, foreign density, cluster density, supplier density, and customer density

Source: Authors' own work

Denmark and Norway) and regional statistics (Finland and non-business sectors in the other countries).

3.4 Measures of spatial structure

Finally, to obtain the measures of interaction across regions, we used the standard "gravity" models from international trade and urban economics (Redding and Rossi-Hansberg, 2017). These rely on having data on travel-related costs per pair of regions and data on total goods flows. The assumption is that while the relative costs between different pairs of regions are easy to compute, for example, using the travel time, the absolute "impedance" to cross-regional interaction can only be inferred from the observed flows.

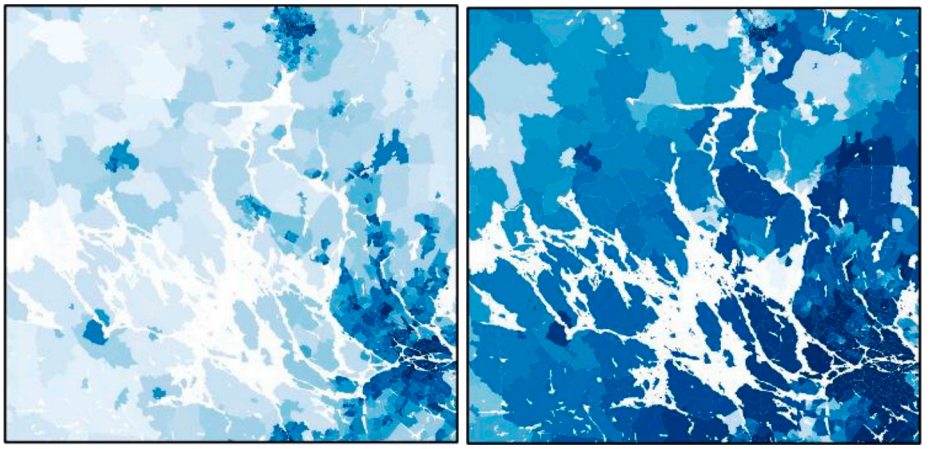

Figure 3. Density and accessibility
Note(s): A pair of side-by-side geographic maps showing regional areas with varying shaded intensities illustrating differences in spatial patterns across the two panels
Source: Authors' own work

The procedure begins with computing the travel times along the relevant transportation modes. We used a combination of OpenStreetMap, public transit schedule feeds covering all public transport in the Nordics, and geographic information systems to compute about 500 million shortest paths using car, train, bus, ferry and plane. We can also use the estimated preference for each mode of transportation to merge the indicators into a single measure. We used the estimates in Protsiv and Sheard (2024) to do so. More details on the data and algorithms used to compute interregional distances can be found in the Appendix.

The final step in quantifying connectivity is to assess the importance of distance. As this study examines locations where organizational presence entails interpersonal interaction rather than trade in goods, the focus is on the costs of moving people rather than physical goods. We approximate accessibility based on commuting flows using a comprehensive data set on regional-to-regional commuting flows in the Nordic countries. It is worth noting that, although the gravity equations impose rather strong functional form assumptions, the fit to the data is satisfactory. We find that the elasticity of the share of people commuting between regions with respect to the distance between the regions is nearly −1. This suggests that the inverse distance weighting commonly used in the literature is a plausible approximate alternative, although the distance should preferably be measured taking into account the actual infrastructure in the regions and modal preferences. A summary of the statistical calculations is provided in Table 2.

4. Results

The key question of this study is whether foreign-owned firms, compared to domestic firms, tend to locate in denser areas, with respect to both urbanization and localization economies. To address this question, we constructed a series of logistic regressions where the outcome variable indicates whether a plant is foreign-owned, and the predictors are various agglomeration measures that could affect the attractiveness of a location. The rationale behind this design, rather than using foreignness as a predictor, is that it allows us to include

Table 2. Summary statistics

Indicator	Min.	Q1	Median	Mean	Q3	Max.
log(urban_density)	−4.255	−0.479	0.000	0.157	0.590	2.906
log(foreign)	−10.784	−2.328	0.000	−0.215	2.078	9.856
log(cluster)	−5.686	−0.899	0.000	0.026	0.859	5.426
log(market)	−9.917	−2.312	0.000	−0.206	1.988	10.623
log(supplier)	−12.786	−2.318	0.000	−0.204	2.023	11.789
log(employees)	0.000	0.265	0.852	1.197	1.946	9.623
Easting, 1000	1 213	1 336	1 489	1 484	1 623	1 880
Northing	6 124	6 397	6 569	6 545	6 604	7 633

Source(s): Authors' own work

multiple agglomeration-related explanatory variables within the same model. To interpret the model, it is helpful to imagine selecting one plant at random from all plants in Sweden, without knowing whether it is domestic or foreign. By examining the characteristics of the plant (e.g. its industry or number of employees) and of the region in which it is located (e.g. an urbanization measure), we can make a more informed guess about whether the plant belongs to an MNE. The significant positive coefficients for variables in the tables below imply that a plant with a higher value of that variable has a higher probability of being foreign-owned. In this way, we directly compare the typical locational characteristics of domestic and foreign-owned firms.

The first task is to explore whether foreign firms are more likely to be located in denser areas. For this purpose, we use a data set of 336,023 plants with at least one employee (see Table 3 below).

Examining Model 1, we can see a large positive effect of urbanization, suggesting that a given firm is 34% more likely to be foreign when the density of economic activity at a particular location doubles (the exact probability would be different depending on the values of urbanization due to the non-linear nature of logistic regression). This is a strong result, but it is conditional on the industry of the firm (and thus the industry-specific FDI intensity). However, the model still excludes many relevant variables. The features of the plant itself could also impact the sought probability. Larger plants are more likely to be owned by a

Table 3. Urbanization of foreign firms

	All industries			Traded industries	
Indicator	1	2	3	4	5
log(urbanization)	0.342[a]	0.313[a]	0.101[a]	0.299[a]	0.172[a]
log(foreign density)			0.113[a]		0.065[a]
log(employees)		0.245[a]	0.231[a]	0.530[a]	0.522[a]
multiplant		2.826[a]	2.808[a]	2.101[a]	2.080[a]
Intercept	34.30	30.51	23.19	18.72	12.57
Regional coordinates	Y	Y	Y	Y	Y
Industry dummies	Y	Y	Y	Y	Y
Observations	336,023	336,023	336,023	135,033	135,033
AIC	194508	149186	147760	60726	60557

Note(s): [a]significant at < 0.01 level
Source(s): Authors' own work

foreign company, and the same holds true for plants belonging to a multi-plant corporation. The addition of these factors further improves the model, as evidenced by a significant increase in explanatory power, as indicated by the drop in the Akaike Information Criterion (AIC). The coefficient of urbanization drops to 31% but remains highly significant and robust to different specifications of industries and firm characteristics.

Before moving to more detailed agglomeration mechanisms, the issue of mimicking behavior merits discussion. Adding the density of foreign firms to the model (Table 3) highlights the importance of the presence of other foreign firms for the probability that a given firm will also be foreign. This suggests that foreign firms tend to locate closer to each other than to firms in general. The data, however, are insufficient to determine whether this is due to mimicking behavior or due to other location-dependent factors that impact foreign firms differently than domestic ones.

Another important question is whether these effects differ substantially between firms in internationally oriented industries (so-called "traded" industries, see Delgado *et al.*, 2016) and those in more local industries, such as retail stores and restaurants. We compare models 4 and 5 to models 2 and 3, respectively, and find no substantial differences in the relevant coefficients. One way to account for industry-specific agglomeration benefits is to analyze the impact of industrial clusters, operationalized here by the density of the industry to which a firm belongs (see Table 4 below).

In our analysis, we make the populations of foreign and domestic firms more comparable by selecting only firms with 10 employees or more. The median number of employees go from 2.3 and 7.3 in domestic and foreign firms, respectively, to more comparable 19 and 26. Models 1 and 2 show that localization in fact captures most of the urbanization's effect, and for traded firms, the coefficient on urbanization becomes effectively zero. Adding further measures of agglomeration, market and supplier access, to the previous measures results in very similar effects: they are all usually positive and highly significant and are better predictors than urbanization. In particular, supplier access appears to have the largest effect; however, the measures are quite strongly correlated, and their relative importance is difficult to ascertain. This is evidenced by the market access coefficient becoming negative when supplier access is included, due to their high correlation. We have assessed the issues of multicollinearity using variance inflation factors, and the only problematic models are those that include both customer and supplier access, so we do not report those results.

Table 4. Localization of foreign firms, large plants only

	All		Traded	
Indicator	1	2	3	4
log(urbanization)	0.024	−0.044	−0.082[a]	−0.090[a]
log(cluster)	0.242[a]	0.297[a]	0.281[a]	0.279[a]
log(customer access)			0.031[a]	
log(supplier access)				0.035[a]
Intercept	31.77	8.72	6.89	6.59
Regional coordinates	Y	Y	Y	Y
Industry indicators	Y	Y	Y	Y
Observations	57,370	18,280	18,280	18,280
AIC	54888	20229	20218	20214

Note(s): [a]significant at < 0.01 level
Source(s): Authors' own work

The above analysis suggests that foreign firms tend to choose locations that are more favorable from an economic perspective, with greater potential for partnerships in proximity. An interesting effect is that these measures seem to eliminate all the positive effects of urbanization, rendering its overall impact negative. This could suggest that foreign-owned firms actually avoid cities if being there does not grant them sufficient economic benefits in terms of access to markets, suppliers and workers, or that they evade negative effects of urban density, such as high costs, regulations or competitive intensity, in relation to their industry-specific requirements (Porter, 1998). Hence, clusters provide more specialized resources that foreign firms need, which statistically override the general effects of urbanization. The density of foreign firms remains the most significant predictor even after many economic effects are controlled for. This lends some additional weight to the argument that foreign firms mimic each other's location decisions, but it remains difficult to demonstrate conclusively.

The results confirm the effects suggested in *H1* and *H2*. The foreign-owned firms are more urban, more likely to be in clusters and more likely to have better market and supplier access than their domestic counterparts. The effects are robust to changes in the industry-aggregation level, controlling for plant attributes, or limiting the analysis to large plants only. The analysis also confirms *H3*, indicating that foreign-owned firms tend to co-locate with other foreign firms in the market.

In general, the results of this section suggest that foreign firms consistently choose more dense locations. There are different explanations for this effect. It could imply that MNEs that make market investments are better managed and thus have greater capacity to select more beneficial locations, or that they are less constrained by other factors than their domestic counterparts and thus have greater freedom to choose where to locate.

5. Discussion and conclusions

This paper aimed to investigate whether foreign firms make different choices regarding various agglomeration externalities than domestic firms. In our study, we found support for the stated hypotheses. Multinational firms tend to choose more densely populated locations, both in terms of city agglomerations and clusters, compared to domestic firms. The findings reveal a broader pattern: MNEs tend to avoid locations where the economic benefits are uncertain. To the extent this pattern is not merely coincidental, it suggests that MNEs weigh cost-benefit tradeoffs and area-specific constraints, such as costs, labor availability, regulations and competitive intensity, against their industry-specific requirements (Porter, 1998). (At the individual firm level, the decision to avoid dense areas may off-course stem from factors beyond rational analysis, such as overcrowding or a lack of available space for new establishments.)

Results inform our understanding of internationalization and localization patterns. Past literature has emphasized the importance of local embeddedness in shaping and sustaining business. The literature suggests that local firms may have privileged access to knowledge because they are embedded in the local business environment (Jack and Anderson, 2002; Dahl and Sorenson, 2012; Sorenson, 2018). Embeddedness in local social structures enhances performance (Jack and Anderson, 2002), as it deepens existing positions in business networks, while also increasing the ability to identify new business opportunities and reduce perceived uncertainty and psychic distance (Zaheer, 1995; Johanson and Vahlne, 2009). Therefore, the literature suggests, it enables firms to select locations that generate the greatest economic output.

This study, in contrast, provides evidence that MNEs can leverage *location flexibility* relative to local firms by choosing to locate in dense areas, which may generate value to the

firm. The results indicate that when choosing among agglomerated locations, MNEs possess relative location flexibility at the subnational level, enabling them to establish activities where their resources complement those of other actors, thereby creating resource synergies that may contribute to the development of local clusters. The term "relative location flexibility" is inspired by the discussions of Buckley and Casson (1998), who emphasized the importance of seeking out locations where MNEs can adapt their production and sales to local conditions. In contrast to their account of the internal reorganization of resources as a response to environmental uncertainty, "MNE relative location flexibility" focuses on relative location, emphasizing comparisons with other local firms. Our concept underscores the comparative advantages of MNEs *vis-à-vis* local firms in making informed locational choices at the subnational level.

The finding opens the door to a discussion about the value of local knowledge and local embeddedness. While local embeddedness offers advantages, it can also make domestic firms path-dependent and bound to locations to which they have historical ties, thereby constraining their flexibility. Localization decisions that seem rational to managers are often constrained by local knowledge at the subnational level, which can disadvantage them and reduce their flexibility in terms of location. By contrast, the absence of such local path dependency can be advantageous. Our findings also contrast previous research that points to the lack of a robust link between multinationality and performance, suggesting that MNEs may face inherent disadvantages in their location strategies (see the meta-analysis by Schmuck *et al.*, 2023).

Our findings also have implications for theories on cluster development. Importantly, we find that innate firm characteristics can explain different localization patterns across groups. Our findings lend support to the idea that clusters grow through organic, strategic decisions made at the organizational level rather than merely through their size or network connectivity (Fromhold-Eisebith and Eisebith, 2005; Johanson and Vahlne, 2009). To attract foreign firms, clusters must demonstrate relevance and tangible benefits that extend beyond their scale and established connections. Furthermore, we provide some insights into theories of mimicking behavior and cluster development. Our study found some support for the idea that firms are inclined to mimic the behavior of other multinationals and locate near their predecessors. This suggests that foreign MNEs attract other MNEs to the same location, creating a positive cycle that contributes to the growth and internationalization of the cluster (Chen *et al.*, 2021). Except for advancing theory, these findings inform managers involved in location decisions.

We conclude that when clusters generate value for MNEs, particularly in high-value clusters, the likelihood of co-location increases. Co-locating MNEs not only benefits from the advantages of clusters but also actively contributes to their evolution. Co-locating MNEs can increase overall value creation in clusters by making them more international (Chen *et al.*, 2021), leveraging and generating knowledge spillovers, developing and sharing infrastructure and enhancing access to skilled labor and business networks (Alcácer and Chung, 2007; Tallman and Phene, 2007). This can be described as a dynamic location pattern that fosters cluster growth. Our finding enriches the understanding of the formative dynamics of clusters, although further evidence is needed to substantiate this claim.

We also add to the discussion on co-location patterns in internationalization. Li *et al.* (2023), for instance, found that MNEs favor locations with a high concentration of firms from their country of origin during exogenous shocks. Similarly, Puig, *et al.* (2020) found that Chinese firms undertaking foreign direct investment prefer geographic locations where there are other Chinese firms. Our findings, instead, show how MNEs are inclined to choose locations with a high concentration of MNEs in general, irrespective of their origin, which is

a compelling distinction. This suggests that the country of origin matters for co-location only under certain conditions, such as during chocks or for specific countries of origin.

Future research could offer insights into these formative dynamics of clusters, for instance, by focusing on the role of co-location in the development of nascent clusters. It could also examine MNEs' mimicking behavior and co-location patterns in relation to market entry, for instance, by providing further insight into how firms make international commitment decisions under extreme uncertainty (Eriksson and Tippmann, 2024). It could also investigate how co-location in key clusters affects how MNEs combine complementary resources and diversify relative to their strategic partners, thereby enhancing their competitive advantage (Yildiz *et al*., 2023). For instance, this may occur through access to resources, shared experiences and communication with spatially proximate firms.

As a final remark, while research within the "new economic geography" has long suggested that digitalization has diminished the importance of location, our study supports a critical examination of such claims (Cairncross, 1997; Kim and Aguilera, 2016) by demonstrating that spatial proximity among relevant business actors remains important.

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Appendix

Computing the distances

The core indicator we use to quantify the interaction across regions is based on bilateral travel times. Since the core component we want to capture is the potential for interpersonal interactions, we focus on passenger travel times and not on the cost of shipping the goods. The approach consists of three steps: computing the travel time between each pair of industries according to the main transportation modes, aggregating these distances into a single measure, and computing the scale of interaction.

To achieve the first goal, we use the data for the road network in the Nordics from OpenStreetMap (www.openstreetmap.org.) giving us the distances and in most cases also the maximum speeds or road classes. We can thus estimate the travel time by car between each pair of regions by picking a representative point in each region and computing the shortest path within this network. To complement this with public transportation travel times, we use the national General Transit Feed Specification (GTFS) transit feeds providing the schedules for every bus, train, and ferry route in the Nordics. Finally, we used the data from Eurostat on the flights between airports to estimate the travel times by plane by computing the simple geodesic distances between airports.

The output of the previous step is the set of five travel times for each origin-destination-mode combination. To combine them we used the coefficients for each mode from Protsiv and Sheard (2024), which are based on a discrete choice model over modes based on the Norwegian Travel Survey (where we assume that modal preferences are similar in Nordic countries for a given set of choices and distances). The result is a weighted sum of the mode-specific distances providing the relative measure of accessibility across regions.

Finally, to get the absolute measure of interaction we need data on the actual flows of people between regions, which we proxied with commuting flows. We fitted the relative measures obtained in the previous step to the SAMS- and municipality-based commuting data set with commuting flows between each pair of regions as the outcome variable (based on official commuting statistics). The coefficient on the composite travel time provided the necessary scale parameter and we obtained our final measure of interaction between each pair of regions.

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